

Towards One NOAA

A Programmatic Plan to Integrate and Improve NOAA's Cryosphere Science and Operations

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National Weather Service

**National Environmental
Satellite Data and
Information Service**

**Office of Atmospheric
Research**

**National Marine
Fisheries Service**

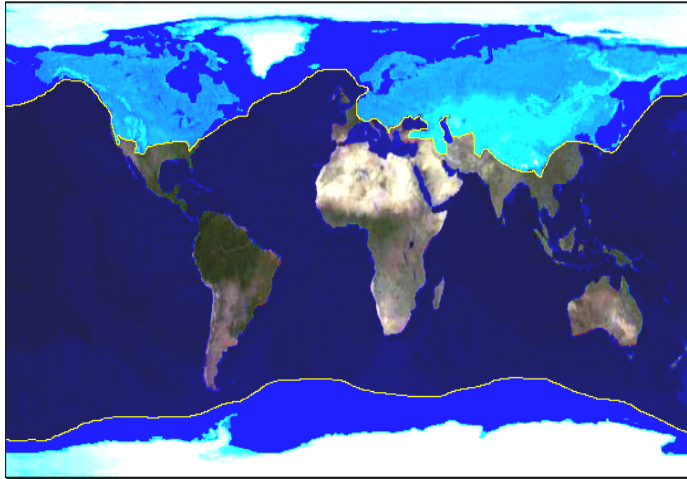
**NOAA Marine and
Aviation Operations**

Cryosphere Science and Operations



- NOAA's Mission

- To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs.



- The Cryosphere

- Consists of large areas of the Earth's land and marine environment where water is either seasonally or permanently frozen.
- Interacts with the atmosphere, hydrosphere, land surface, and biosphere. It is integrally tied to weather and climate, water resources and flooding, ecosystems, transportation, and economies around the world.

- NOAA's Cryosphere Science and Operations

- NOAA's mission involves all aspects of the cryosphere, including:
 - Observation and prediction of winter weather, climate, water supply, and snowmelt flooding,
 - Impacts of snow and ice on land and marine transportation,
 - Sea, lake, and river ice effects on ecosystems, fisheries and marine mammals, and
 - Effects of climate change in cold regions.

Cryosphere Science and Operations



- Why are NOAA's cryosphere activities especially important now?

- The cryosphere is changing significantly and rapidly.
- These changes feed-back to weather and climate processes.
- These changes have important socioeconomic consequences.



Rare snow and ice storm in Portland, Oregon
January 8, 2004

- A Critical Threshold

- The cryosphere exists near a critical threshold: the melting (and freezing) point of water.
- As this threshold is crossed *in both directions*, increased variability in weather and climate results in dramatic changes to the Earth's cold-region environments.



- Understanding and predicting changes in the cryosphere is emerging as a key challenge for NOAA's mission.

NOAA's Cryosphere Initiative



- **Form an Integrated Cryosphere Program within NOAA**
 - Nearly 50 different entities within NOAA are currently involved in various aspects of cryosphere science and operations.
 - These reside within five of NOAA's line offices (NWS, NESDIS, OAR, NMFS, and NMAO).
 - They span all of NOAA's mission goals in nine different mission goal programs.
 - A single program is needed to integrate and coordinate these activities, and provide "one door" for NOAA's cryosphere science and operations.
 - A central program within NOAA is critical to facilitate interagency partnerships and to engage more effectively both private- and public-sector stakeholders.
- **Strengthen NOAA's "centers of cryosphere expertise"**
 - National Operational Hydrologic Remote Sensing Center (NOHRSC) - snow
 - National Ice Center (NIC) – sea and lake ice
 - National Snow and Ice Data Center (NSIDC) – Cryosphere Data "Warehouse"
 - These centers are currently "dedicated" to the cryosphere but are small and lack critical mass.
 - Strengthened, these centers can be used as a backbone to:
 - Provide structure for NOAA's cryosphere research,
 - Ensure a direct conduit between research and operations,
 - Enable economies-of-scale that are otherwise missed,
 - Ensure strong interagency, international, public, and private partnerships, and
 - Consolidate infrastructure resources.

NOAA's Cryosphere Initiative



- A NOAA-wide cryosphere initiative is required to address deficiencies that have accumulated in the absence of a well-coordinated program
 - Observations, Modeling, Products, Research, Training
- Priorities include:
 - *Monitor and Observe*
 - Continued and improved snow and sea ice observations
 - Expansion of airborne snow surveys for snow water content observations
 - *Understand and Describe*
 - 30-year reanalysis of snow characteristics and other cryosphere properties
 - Cryosphere research to improve modeling and data assimilation
 - *Assess and Predict*
 - Transitioning of new snow modeling and analysis capabilities to operations
 - Improved representation of cryosphere processes in NOAA's operational prediction suite
 - Continuation of satellite data for high-resolution sea-ice analyses